

STATE OF NEW YORK



DEPARTMENT OF HEALTH

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DAVID AXELROD, M.D.
Commissioner

December 17, 1985

Linda Granto
2933 Macklen Avenue
Niagara Falls, NY 14301

Dear Ms. Granto:

The Cancer Surveillance Program of the New York State Department of Health has completed the investigation in Census Tracts 219, 220 and 221 in Niagara Falls which you requested.

In summary, no statistically significant excesses of cancer incidence or mortality were detected in Census Tracts 219, 220 or 221. Furthermore, several cancer rates were significantly low. The other small deviations seen between observed numbers of people with cancer and the expected numbers based on population standard rates are within the range which occurs by chance when comparing a single geographic area with a large population.

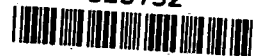
We plan to continue monitoring cancer reporting from Niagara Falls to help us understand the reasons for the deficits in the cancer incidence rate. It is not anticipated that such analyses will change our conclusion of no cancer excess in this area.

I hope that this report answers your questions about cancer incidence and mortality in Census Tracts 219, 220 and 221. If you have any continuing concerns kindly give Ms. Stanish or me a call.

Sincerely,

Holly L. Howe, Ph.D.
Director
Cancer Surveillance ProgramAttachment
cc: Ms. Stanish

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INCIDENCE OF CANCER IN CENSUS TRACTS 219, 220, AND 221
IN NIAGARA FALLS (NIAGARA COUNTY)

BACKGROUND

The investigation was conducted in response to a telephone call to Dr. Susan Standfast of the New York State Health Department on December 19, 1984 from Ms. Linda Granto. She is one of a number of residents who live in the neighborhood south of the CECOS landfill in Niagara Falls who are concerned about any relationship the landfill may have on their health.

Reports had been released from the Environmental Protection Agency (EPA) that toxic chemicals were probably leaking from either the CECOS landfill or the adjacent Dupont Chemical Company site. The EPA's plan of action included further environmental testing to determine whether or not the chemicals were migrating.

On December 20, 1984, Dr. Standfast contacted Ms. Sandra Stanish, Health Liaison for the New York State Health Department, for the most recent information on the environmental testing and the Community's plans to do a health survey. Ms. Stanish became closely involved in the investigation as the liaison between the State Health Department and the community. By February 28, 1985, a list of persons affected by cancer prepared by Ms. Granto was received by the Cancer Surveillance Program. Mr. David Brooks of the City of Niagara Falls Department of Planning and Development assisted us by defining the geographic areas by census tract which were most likely to be affected.

METHODS

CANCER INCIDENCE

The area of concern was south of the CECOS landfill. The concerned residents lived in Census Tract 219. The City Planner recommended that we also examine Census Tracts 220 and 221. (See attached map of the location and boundaries of the three census tracts.) Thus all three tracts were included in the investigation.

The first step was to identify all newly diagnosed cases of cancer among residents of Census Tracts 219, 220 and 221. The source for these data was the New York State Cancer Registry. The Registry contains information on all cases of cancer reported by hospitals and physicians to the New York State Department of Health, as mandated by law. The period studied for this investigation was the years 1973 through 1982, the most recent year for which reporting to the Registry was considered complete when the study began.

A listing of cases by street name was obtained for Niagara Falls. The address for each case was examined to determine whether the person lived in Census Tract 219, 220 or 221 at the time of diagnosis. All cases with a street address located within the boundaries of the three census tracts were grouped by tumor site, sex, and age. These are referred to as the "observed" cases.

The next step was to determine whether this observed number of cancer cases exceeded the number that would be expected in a population with the same size, age and sex distribution as Census Tracts 219, 220 and 221 if its cancer incidence rate were the same as other urban areas in New York State, exclusive of New York City (upstate New York). Since cancer incidence may vary between

urban and rural areas, we employed a standard based on population density to generate expected numbers of cancer cases to compare with the number of observed cases in Census Tracts 219, 220 and 221. All of the minor civil divisions of upstate New York have been assigned to one of five different groups according to the number of residents per square mile in 1980 (the population density). Group V contains all areas with the lowest population density and Group I, all areas with the highest population density. Census Tracts 219, 220 and 221 are in Group I.

According to the 1980 U.S. Census, the total population in Census Tracts 219, 220, and 221 combined is 7,725, including 3,686 males and 4,039 females. In Census Tract 219, the population is 1,922, including 937 males and 985 females. Age- and sex-specific incidence rates for Group I in upstate New York for 1976-1980 were used to estimate the expected number of cases for the most common cancer sites and for all sites combined among residents of the study area. Thus, the expected number of cancer cases was adjusted for sex, age and population density.

The Poisson model was used to assess the probability that chance alone could explain a given increase or decrease in the observed number of cancers relative to the expected number. (1). If the probability was 0.025 or less for any cancer site, it was considered to be a statistically significant excess or deficit.

Seventeen of the most common cancer sites were examined among the men. These included, among others, lung, colon, rectum, prostate, lymphoma, leukemia, and bladder. Nineteen of the most common sites were examined among the women. In addition to the aforementioned sites (except prostate), cancers of the breast and reproductive organs were also included.

Ms. Granto reported 11 cases of malignant tumors. The diagnosis of four of these cases could be confirmed. All occurred during the time period of the investigation, 1973-1982, and were therefore included in the analysis. Since the listing received from Ms. Granto did not include first names or in some instances, the sex of the case, we did not have sufficient information to confirm the diagnoses of the seven remaining cases by matching with names in the master cancer registry file.

CANCER MORTALITY

Variation in cancer incidence among different geographic areas reflects not only true differences in cancer incidence, but also the practices of diagnosing, treating, and recording cancers in various areas of the State. Completeness and accuracy of the Registry depends upon reporting from hospitals. It is estimated that over 95 percent of all cancer cases are reported to the Registry in upstate New York. From 1976 to 1982, the reporting from Niagara County was over 97 percent complete. It is not known, however, the specific level of reporting for Census Tracts 219, 220 and 221.

The number of cancer deaths, or cancer mortality, occurring in Census Tracts 219, 220 and 221 during the period 1973 through 1982 was also examined.

The observed number of cancer deaths was compared to the number of deaths that would be expected in an area of the tracts' size, and residents' sex and age composition. The source for these data was the New York State Bureau of

Biostatistics. The procedure for studying cancer mortality followed the steps listed above for cancer cases. The expected number of cancer deaths was adjusted for sex and age by calculating the rates for upstate New York in 1978 - 1982. Again the Poisson model was used to test for statistically significant increases or deficits. (1).

RESULTS

CANCER INCIDENCE

Census Tracts 219, 220, 221 Combined

For all cancer sites combined, the total incidence of cancer for both sexes in the study area was lower than the number of cases expected: 298 were observed and 354 were expected. In men, 164 cases were observed and 191 were expected. In women, 134 cases were observed and 163 were expected. The total number of cases as well as the number of cases observed among women were significantly lower than the expected number of cases (See Table). The number of cases among men were also low, but of borderline significance.

The sites of cancer most commonly diagnosed among men were lung, reproductive (prostate and testes), colo-rectal, and urinary tract. Specifically, 46 cases of lung cancer were observed, while 44 were expected. Twenty-two cases of male reproductive cancer were observed, and 27 were expected. Twenty-three cases of colo-rectal cancer were observed while 31 were expected. Sixteen cases of cancer of the urinary tract were observed and

20 were expected. Buccal cancer was significantly lower than expected: one case was observed while 9 were expected.

The sites of cancer most commonly diagnosed among women were breast, lung, reproductive organs, and colo-rectal. Thirty-one cases of breast cancer were observed; however, 45 were expected. This was a statistically significant deficit. Thirteen cases of lung cancer were observed, and 16 were expected. Twenty-seven cases of cancer of the reproductive organs were observed while 26 were expected. Fifteen cases of colo-rectal cancer were observed and 25 were expected. This deficit in colo-rectal cancer was statistically significant.

Census Tract 219

For all cancer sites combined, the total incidence of cancer for both sexes in Census Tract 219 was not significantly different from the number of cases expected: 56 were observed and 66 were expected. In men, 43 cases were observed and 36 were expected. In women, 13 cases were observed and 30 were expected. The number of cases among women was significantly lower than the expected number of cases.

The sites of cancer most commonly diagnosed among men were lung, male reproductive, colo-rectal, and urinary tract. None of these or any of the other sites examined had observed numbers of cases significantly different from the expected numbers. Specifically, 15 cases of lung cancer were observed, while 9 were expected. Five cases of reproductive cancer were observed, and 4 were expected. Five cases of colo-rectal cancer were observed and six were expected. Six cases of urinary cancer were observed and four were expected.

The site of cancer most commonly diagnosed among women was lung. Three cases were observed and 3 were expected. Cases of breast cancer showed a statistically significant deficit. One case was observed while 9 were expected. None of the other cancer sites examined had an observed number of cases significantly different from the expected number.

CANCER MORTALITY

Census Tract 219, 220 and 221 Combined

The analysis of cancer mortality among males and females in the three tracts combined suggested also that there was no excess in cancer. Cancer deaths were reported among 113 males while 96 were expected. Among women, 77 deaths were reported and 73 were expected. No statistically significant excess in overall cancer mortality or cancer mortality for either males or females could be detected in the three census tracts combined during the study period.

Census Tract 219

The analysis of cancer mortality among males and females in Census Tract 219 suggested that there was no excess in cancer. Cancer deaths were reported among 24 males while 17 were expected. Among women, 14 deaths were reported and 13 were expected. No statistically significant excess in overall cancer mortality or cancer mortality for either males or females could be detected in Census Tract 219 during the study period.

DISCUSSION AND CONCLUSIONS

In drawing conclusions from these data, two aspects of the statistical method need to be considered. First, since there were 72 significance tests, it was anticipated that three or four results might appear statistically significant even though the differences between observed and expected numbers were due entirely to random fluctuations in the data. None of the significance tests in these investigations indicated an excess of cancer, although some did indicate a deficit in cancer incidence.

The second aspect is the power of the statistical test, that is, the probability that a true departure from the expected number can be detected by significance testing. The power of a test varies with the number of cases expected. For example, using the statistical test described above, the probability of detecting a true doubling in cancer incidence over the expected value will be 90 percent or higher when the expected number is at least 16.

In the study area, the power of detecting a doubling was high for several of the tests performed: overall cancer incidence in all census tracts combined and overall cancer in Census Tract 219. A doubling could also be detected for males and females in both areas. Statistical power was also high to detect a doubling in all tracts combined for lung cancer among males and females, colorectal cancer among males and females, breast cancer among females and prostate cancer among males.

The total incidence and the site-specific incidence of cancer for any of the individual census tracts included in this investigation did not show a significant excess above the expected figures based on rates for New York State urban areas. Neither did the cancer mortality figures indicate an

excess. Most of the small deviations seen between the observed number of people with cancer and the number expected based on the population standard rates are within the range which occur by chance when comparing a single geographic area with a large population. In several cases, significant deficits in cancer cases were noted: overall cancer cases and cancer in females in the three tracts combined. Buccal cancer in males in the three tracts combined, female colo-rectal and breast cancer in the three tracts combined, and overall female and female breast in Census Tract 219 were also significantly low.

We will continue to monitor cancer reporting from Niagara Falls. It is not expected that such analyses will change our conclusion that there is no excess of cancer in the study area. However, such an analysis will help us understand the reasons that the observed numbers of cancers are significantly lower than the expected numbers in some cases. The reasons could include certain anomalies in the population, such as unusual migration or aging patterns, the specificity of the standard used to calculate expected numbers, or incomplete reporting or changes in reporting of cancer cases to the Registry. It is unknown which, if any, of these factors are affecting the data.

The number of cases of male lung cancer cases was somewhat higher than the expected number in Census Tract 219, even though it did not reach statistical significance. The lung cancer rate in Niagara County is known to be higher than in other areas of New York State. The Bureau of Cancer Epidemiology is currently conducting an epidemiologic study to explain this excess. Since cigarette smoking is one of the most important risk factors for lung cancer,

we examined the smoking histories for the cases diagnosed after 1978, when reporting of smoking information to the Cancer Registry was required. Of the 15 cases of lung cancer, 7 reports included smoking histories. All seven of these cases were smokers at the time of their diagnosis.

Cancer is a common disease, more common than many people believe. One of every three persons will develop it during their lifetime, and it eventually effects three out of every four families. (2). The number of people with cancer is increasing in most communities because more people are living to the ages of greatest cancer occurrence.

Much more research is necessary before the causes of cancer are well understood. Current knowledge, however, suggests that the leading preventable cause is cigarette smoking. Current estimates attribute only 5 percent of cancer mortality to the environment, in other words geophysical factors and pollution. Thirty percent of cancer mortality can be attributed to smoking, 35 percent to diet, 3 percent to alcohol, 7 percent to sexual and reproductive factors, and 4 percent to occupational exposures. (3). It is important to note, therefore, that any possible risk associated with the environment would most likely only have a small effect on cancer mortality in your neighborhood compared to that of tobacco. Furthermore, a twenty year latency period generally exists between exposure to a carcinogen and manifestation of disease.

Everyone should realize that many cancers can be effectively treated if they are diagnosed in their early stages. Screening for cancers of the breast, cervix, rectum, colon, and prostate, for example, helps to identify these diseases before the onset of symptoms and at a time when they are usually the most curable. Many persons could reduce their chances of

developing or dying from cancer by adapting a healthier lifestyle and by visiting their physician regularly for a cancer-related checkup.

References

1. Molina, E.C. Poisson's Exponential Binomial Limit. Huntington, NY: Robert E. Krieger Co., 1973.
2. American Cancer Society. Cancer Facts and Figures. New York: American Cancer Society, 1985.
3. Doll R. and Peto R. The Causes of Cancer. Oxford: Oxford University Press, 1981.

Observed and Expected Numbers of Cancer Cases
1973 - 1982 By Site and Sex
Niagara Falls Census Tract 219, 220, 221 Combined

New York State Cancer Registry

Site (ICD-9) ^a	Males		Females	
	Observed	Expected ^{b,c}	Observed	Expected ^{b,c}
All Sites (140-208)	164	191	134 ^d	163
Buccal (140-149)	1 ^d	9	3	4
Colon and Rectum (153-154)	23	31	15 ^d	25
Other Digestive Organs (Stomach, liver, pancreas) (151, 155, 157)	17	15	7	9
Lung (162)	46	44	13	16
Breast (174)	-	-	31 ^d	45
Female Reproductive (uterus, cervix, ovary) (179, 180, 182, 183)	-	-	27	26
Male Reproductive (prostate, testis) (185, 186)	22	27	-	-
Urinary Tract (kidney, bladder) (188, 189)	16	20	5	7
Leukemia and Lymphoma (200-202, 204-208)	13	13	9	10
Other	26	32	24	22

^a Classification of site was done using the International Classification of Disease 9th edition.

^b Expected number derived by applying age-sex-population density-specific rates for urban New York State excluding New York City, to the 1980 population of Census Tracts 219, 220 and 221 in Niagara Falls.

^c Expected numbers may not add to total due to rounding.

^d $p < .025$

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